CLAIMS

1. A method of treating water comprising:

introducing water into an electrochemical device to produce treated water and a concentrate stream;

recirculating at least a portion of the concentrate stream in a concentrating compartment of the electrochemical device; and

discharging a predetermined portion of the concentrate stream according to a predetermined discharge schedule.

2. The method of claim 1 further comprising repeating discharging a predetermined portion of the concentrate stream.

3. The method of claim 2 further comprising reversing an electric field applied across the electrochemical device according to a predetermined charge schedule.

4. The method of claim 3 further comprising measuring a treated water property.

5. The method of claim 4 further comprising adjusting the predetermined discharge schedule based on the treated water property.

6. The method of claim 5 wherein discharging a predetermined portion of the concentrate stream comprises actuating a flow regulator.

7. The method of claim 6 further comprising applying a positive charge on the flow regulator.

8. The method of claim 7 wherein applying a positive charge follows a predetermined charge schedule.

9. The method of claim 8 wherein the flow regulator comprises a valve.

10. The method of claim 4 further comprising adjusting the predetermined portion of the concentrate stream based on the treated water property.

11. The method of claim 4 further comprising calculating a LSI of the treated water.

12. The method of claim 11 further comprising optimizing the predetermined discharge schedule based on the calculated LSI.

13. The method of claim 1 wherein discharging the predetermined portion of the concentrate stream comprises introducing the predetermined portion of the concentrate stream to an irrigation system.

14. The method of claim 1 wherein the produced treated water is suitable for household applications.

15. An electrochemical device comprising:

a concentrating compartment; and

a positively-charged flow regulator positioned downstream of the concentrating compartment.

16. The device of claim 15 further comprising a power source for applying a positive electrical charge to the positively-charged flow regulator according to a predetermined charge schedule.

17. The device of claim 15 wherein the positively-charged flow regulator comprises a valve.

18. The device of claim 15 wherein the positively-charged flow regulator comprises a plate with a flow orifice.

19. The device of claim 15 wherein the positively-charged flow regulator comprises a graphite material.

20. The device of claim 15 wherein the positively-charged flow regulator comprises a diaphragm valve.

21. A method of facilitating water treatment comprising providing an electrochemical device comprising a concentrating compartment and a flow regulator positioned downstream of the concentrating compartment, the flow regulator constructed an arranged to have a positive charge during operation of the electrochemical device.

22. A method of treating water comprising:
introducing water into an electrochemical device to produce treated water;
storing at least a portion of the treated water;
ceasing production of the treated water; and
replacing any fluid in the electrochemical device with the treated water.

23. The method of claim 22 further comprising flushing the fluids from the electrochemical device after ceasing treated water production.

24. The method of claim 23 wherein the electrochemical device is flushed with treated water.

25. A system comprising:
a point-of-entry;
an electrochemical device comprising a depleting compartment and a concentrating compartment fluidly connected to the point-of-entry;
a positively-charged flow regulator fluidly connected downstream of the concentrating compartment;
a reservoir system fluidly connected to the depleting compartment; and
a point of use fluidly connected to the reservoir system.

26. The system of claim 25 further comprising a power source for applying a positive electrical charge on the flow regulator according to a predetermined charge schedule.

27. The system of claim 25 further comprising a power source for applying an electrical field to the electrochemical device.

28. The system of claim 25 wherein the flow regulator comprises a valve.

29. The system of claim 25 wherein the flow regulator is disposed to discharge a predetermined volume of a fluid according to a predetermined discharge schedule.

30. The system of claim 25 wherein the flow regulator comprises a plate having a flow orifice.

31. The system of claim 25 wherein the reservoir system has a pressure that is above atmospheric pressure.

32. The system of claim 25 wherein the point of use comprises a household appliance.

33. An electrodeionization device comprising:

a concentrating compartment; and

a flow regulator regulated by a controller according to a predetermined discharge schedule and fluidly connected downstream of the concentrating compartment for regulating a flow of a waste stream to a drain.

34. The device of claim 33 wherein the flow regulator comprises a valve.

35. The device of claim 33 further comprising an electric power source for applying a positive charge on the flow regulator.

36. The device of claim 35 wherein the controller regulates the electric power source applying the positive charge according to a predetermined charge schedule.

37. A method of softening water comprising:

introducing water to a depleting compartment of an electrochemical device to produce softened water;

recirculating a concentrating stream in a concentrating compartment of the electrochemical device; and

changing a pH of the concentrating stream proximate a flow regulator.

38. The method of claim 37 wherein changing the pH of the concentrating stream changes the pH to less than about 7.

39. The method of claim 37 wherein changing the pH comprises generating hydrogen ions.

40. The method of claim 39 wherein generating hydrogen ions comprises applying an electrical charge on the flow regulator.

41. The method of claim 40 wherein the electrical charge is applied according to a predetermined charge schedule.

42. The method of claim 41 further comprising measuring a property of the softened water.

43. The method of claim 42 wherein adjusting the pH comprises generating hydrogen ions.

44. The method of claim 42 wherein adjusting the pH applying an electrical charge on the flow regulator according to a charge schedule

45. The method of claim 44 further comprising adjusting the charge schedule based on the softened water property.

46. An electrodeionization device comprising:

a concentrating compartment with a flowing waste stream; and

a diaphragm valve for regulating a portion of the flowing waste stream from the concentrating compartment to a drain.

47. The electrodeionization device of claim 46 wherein the diaphragm valve is actuated according to a predetermined schedule.

48. An electrodeionization device comprising:

a concentrating compartment with a flowing waste stream; and

means for discharging a portion of the waste stream from the concentrating compartment to a drain according to a predetermined schedule.

49. The electrodeionization device of claim 48 further comprising means for applying a positive charge on the means for discharging a portion of the waste stream.

50. The electrodeionization device of claim 48 further comprising means for adjusting the predetermined schedule.

51. The electrodeionization device of claim 48 further comprising means for generating hydrogen ions species in the fluid surrounding the means for discharging.

52. An electrochemical device comprising:

a concentrating compartment with a waste stream;

means for discharging the waste stream to a drain; and

means for applying a positive charge on the means for discharging the waste stream.

53. A method of facilitating fluid treatment comprising providing a fluid treatment system comprising an electrochemical device comprising a depleting compartment and a flow regulator regulated by a controller according to a predetermined discharge schedule and fluidly connected downstream of the concentrating compartment for regulating a flow of a waste stream to a drain.

54. The method of claim 53 further comprising connecting the water treatment system to a household point-of-entry.

55. The method of claim 53 further comprising connecting the water treatment system to a household point of use.